REMARKS

Claims 1, 3-26 and 29-38 are currently pending in the application. New claims 39-42 are presented for consideration.

Claims 1, 3, 4, 6-15, 17 and 21-38 stand rejected under 35 USC §103 as obvious over "Japan '141" in view of U.S. Patent No. 4,503,826, to Kessler et al. (Kessler), and further in view of U.S. Patent No. 4,326,487, to Maisch et al. (Maisch). Claim 5 stands rejected under 35 USC §103 as obvious over Japan '141 in view of Kessler and Maisch, and further in view of U.S. Patent No. 6,722,305 (Mizushima). Claims 16 and 18-20 stand rejected under 35 USC §103 as obvious over Japan '141 in view of Maisch and Kessler, and further in view of U.S. Patent No. 6,009,856, to Smith, III et al. (Smith).

Reconsideration of the rejection of claims 1, 3-26, 29-38 and favorable consideration of new claims 39-42 are requested.

In rejecting claim 5, the Examiner takes the position that this claim is "unpatentable over Kessler, Maisch and Japan ('141) as applied to claim 1 above, and further in view of Mizushima" (at page 3 of Action). It is not clear in making this rejection whether Japan '141 is being relied upon as the primary reference or whether Kessler is used for this purpose, given the order stated. Clarification is requested.

Preliminarily, it should be noted that while the claims are directed to a "combustion apparatus", and in the case of claim 22 and its dependent claims a subassembly for a "combustion apparatus", the disclosure and claims are focused specifically on a device for continuously generating heat, as opposed to a device such as an internal combustion engine. As seen in Figure 1, for example, the device shown therein has a combustion

chamber 10 with holes 56, 57 formed through a wall bounding at least a portion thereof. These holes are designed to introduce air from a blower 11 into the chamber. As shown in Figure 2, the chamber is open at its bottom to permit continuous air flow. The flame, resulting from burning of the fuel, extends downward through the open bottom of the combustion chamber to heat an object. This construction would be readily understood by anyone skilled in this art to be one designed to cause a flame to continuously heat an object, without fluctuations, other than those selected through different opted for temperature settings.

It is respectfully submitted that the considerations in designing a combustion apparatus for continuously heating an object, such as water, or the like, and an internal combustion engine, are very significantly different. To clarify the structure, and more clearly distinguish it from an internal combustion, amendatory claim language has been added to each of the pending claims.

Exemplary claim 1 recites a combustion chamber in which fuel from the fuel tank is burned to generate heat. The spraying means is now more specifically characterized as configured to cause fuel supplied from the fuel tank to be continuously supplied to the combustion chamber for continuous burning therein and generation of heat.

Similar limitations have been added to independent claims 8 and 13.

Claim 22 characterizes the channel as configured to flow fuel continuously to a combustion chamber.

Claims 39-42 characterize the spraying means in claims 1, 8, 13 and 22 as a return type nozzle. This return type nozzle is specifically described in the applicant's specification

on page 1, in lines 9-14. Specific characterization of the spraying nozzle in applicant's Description of the Preferred Embodiments has been added on page 19.

While the disclosure has been clarified, no new matter has been introduced as clearly the amendatory language is supported by the original written disclosure and drawings.

Applicant is also including herewith an excerpt from the book "Fluid Mechanics" authored by Frank Creith. On page 3-183 of that writing, a return type nozzle is described, as commonly understood by those skilled in the art to be a nozzle which does not incorporate a valve mechanism and that is configured to continuously deliver fuel from a supply to a combustion chamber and deliver unburnt fuel through a return line. Exemplary return type nozzles are also shown in each of U.S. Patent Nos. 3,592,574 (Zenkner) and 6,647,777, to Kotaka et al. (Kotaka).

Applicant respectfully submits that the design considerations in fuel delivery for internal combustion engines are very different than those for a continuous heat generator. An internal combustion engine incorporates fuel delivery systems wherein the fuel is introduced cyclically and intermittently in a pulsed manner. Further, fuel is not ignited and burned simultaneously with its sprayed introduction.

On the other hand, a heater that combusts sprayed fuel incorporates delivery structure through which the fuel is continuously supplied and combusted simultaneously with its introduction. To achieve this continuous combustion, the claimed heating/combustion apparatus incorporates the return type nozzle and controls rate of

delivery of fuel to the combustion chamber through valve structure in a return line. The system is designed to continuously cause fuel flow through the nozzle.

Each of Maisch, Kessler, and Smith, cited by the Examiner, is related to fuel flow in internal combustion engines. Only Japan '141 is directed to a device designed to continuously generate heat, as claimed by the applicant.

The Examiner takes the position that it would be obvious to incorporate Maisch's valve in the return line of Japan '141 to arrive at what applicant has claimed. Maisch is directed to fuel control in an internal combustion engine and is not directed to a structure associated with a return type nozzle. Maisch controls fuel delivery by means of a metering and distribution valve 7 and a magnetic valve 37. As understood by the applicant, Maisch's design is operable to cause the cyclical delivery of fuel based upon operating requirements and is not intended to be closed and opened intermittently or periodically thereby to adjust an amount of fuel that is continuously sprayed, as required in applicant's independent claims 1, 8, and 13, and the claims depending therefrom.

Applicant respectfully submits that it would not be obvious to simply interchange fuel control components between heaters and internal combustion engines. While, as the Examiner notes in the paragraph bridging pages 2 and 3 of the Action, Maisch does use a valve that is controlled to regulate the output of fuel, applicant respectfully submits that the output in Maisch is not "continuous" in the sense that it is with the claimed heater wherein fuel is required to be continuously both injected and burned. On the other hand, Maisch, by reason of being related to an internal combustion engine, is directed to fuel

delivery that appears to be periodically interrupted through operation of the valve, and thus is not "continuous" in the sense claimed.

Applicant respectfully submits that in the mature art area of combustion, there has not existed a spraying means that continuously feeds and returns fuel and varies amount of fuel continuously sprayed by an intermittently operating valve disposed in a return channel. Applicant respectfully submits that any motivation for incorporating such a valve from the art, cited collectively by the Examiner, comes only from applicant's own disclosure, which is used to perform hindsight reconstruction of Japan '141.

Even if Maisch's injection system were to somehow be incorporated into Japan '141, consistent with Maisch's disclosure, it would be done so in a manner whereby there would be interrupted delivery of fuel as typical of a system used for internal combustion engines. This is not what the applicant's claims are directed towards.

It is also significant to note that Maisch discloses fuel flow control that involves a coordination of two valves 7, 37. These valves are constructed to cooperate with each other and other structure peculiar to Maisch in a manner whereby it would be inappropriate to simply suggest incorporation of but one of these valves (37) into Japan '141, as the Examiner has done.

Kessler is relied upon for the disclosure therein of structure peculiar to the valve, and does not, alone or in combination with Maisch and/or Japan '141, teach or make obvious the above noted structure. This is true also with respect to Mizushima and Smith.

The dependent claims recite further significant limitations with respect to the system that further distinguish over the applied art.

Reconsideration of the rejection of claims 1, 3-26 and 29-38 and allowance of the case are requested.

The additional claim fee of $200.00 is enclosed. Should additional fees be required in connection with this matter, please charge our Deposit Account No. 23-0785.

Respectfully submitted,

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